

## **TITLE OF THE INVENTION**

A structural wooden joist.

## **5 FIELD OF THE INVENTION**

The present invention pertains to a structural wooden joist used in building constructions.

## **BACKGROUND OF THE INVENTION**

10 Wooden joists are used increasingly in a number of building applications. They comprise top and bottom elongated chords with intervening struts joined to the chords by means of scarfing.

One such wooden joist may be found described in U.S. Patent No. 5,664,393  
15 issued to Applicant on September 9, 1997 and consists of lower and upper chords which are joined by an openwork web structure. This web structure includes, between opposite ends thereof, a series of horizontally-spaced trapezoidal laminated panels defining of series of triangular spacing therebetween. Each panel has opposite short and long sides adhesively joined  
20 to the lower and upper chords respectively, and each panel is formed of short obliquely extending planks adhesively secured edgewise to one another.

It has been found that such structure does not offer adequate resistance to humidity variations which cause some deformation of the joist structure.

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## **OBJECTS AND STATEMENT OF THE INVENTION**

It is an object of the present invention to provide an improved wooden joist which overcomes the above-mentioned problem known in the prior art. The joist is characterized by an openwork web structure joined to the chords wherein the  
30 web structure consists of a series of connector members formed of inclined branches, each branch being formed of at least two adhesively secured planks.

The present invention therefore relates to a structural wooden joist which comprises:

- a) an elongated lower chord;
- 5 b) an elongated upper chord in a spaced apart generally parallel opposed relation to the lower chord; and
- c) an openwork web structure joining the chords; this web structure comprising a series of connector members formed of inclined branches and adhesively secured to the lower and upper chords; each branch of the connector
- 10 members being formed of at least two planks having contiguous sides adhesively joined to one another; the connector members defining a series of triangular openings in the web structure.

In one form of the invention, each opposite end of the web structure includes a  
15 laminated panel which is formed of a series of planks secured edgewise to one another and having their upper and lower sides adhesively joined to the upper and lower chords.

In another form of the invention, the obliqueness of the branches of the connector  
20 members has a different angle relative to the horizontal plane of the chords depending on the height of the joist.

Other objects and further scope of applicability of the present invention will  
become apparent from the detailed description given hereinafter. It should be  
25 understood, however, that this detailed description while indicating preferred embodiments of the invention, is given by way of illustration only since various changes and modifications within the spirit and scope of the invention will be come apparent to those skilled in the art.

### 30 BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is an elevational view of a wooden joist made in accordance with the present invention;

Figure 2 shows a V-shaped arrangement of two connector members;

Figure 3 is an end view of the arrangement shown in figure 2;

- 5     Figure 4 is an elevational view of one end section of the panel structure joined to a connector member;

Figure 5 is an elevational view of another embodiment of a wooden joist made in accordance with the present invention; and

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Figure 6 is another embodiment of a V-shaped arrangement of two connector members.

### **DESCRIPTION OF PREFERRED EMBODIMENTS**

- 15     Referring to figure 1, there is shown a structural wooden joist, generally denoted 10, which comprises an elongated lower chord 12 and an elongated upper chord 14 spaced apart generally in opposed relation to the lower chord.

An openwork web structure is displayed between the chords 12 and 14. In a major portion of the web structure, there is shown two arrangements of connector members 16, which extend diagonally between the upper and lower chords 12 and 14. These obliquely extending connector members 16 define a series of triangular-shaped openings 18 allowing for passage of various building utilities, such as electrical wires, water conduits, air ducts and like.

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- Referring to figures 2 and 3, there is shown a V-shaped arrangement of two contiguous connector members 16a, 16b, each consisting of a pair of planks 24, 26 (for connector 16a) and 28, 30 (for connector 16b). Planks 24 and 26 are secured to one another along their contiguous side 32, while planks 28 and 30 are secured to one another along their contiguous side 34. The planks are preferably glued together. The opposite ends of the planks 24, 26, 28 and 30 are scarfed. The scarf joints 24a, 26a, 28a and 30a are adhesively secured to the upper chord 14 while the lower extremities 26b and 30b of the planks are also
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scarfed and adhesively secured to the lower chord 12.

At each opposite end of the joist, the web structure includes laminated panels 36 and 38. Referring to figure 4, the laminated panel 38 is formed of a series of vertically extending planks 40 which are secured to one another in edgewise manner, the planks having scarfed joints 40a and 40b, which are adhesively connected to the upper and lower chords. The innermost plank 40' of the laminated panel is joined to a connector member 16 by means of a scarfed edge 41 joined to the scarfed edge 43 of plank 28. A structural glue may also be used to further secure the panels to the chords.

Referring to figures 5 and 6, there is shown another embodiment 110 of the present invention wherein the connector members 116 are adhesively secured to the lower chord 112 and upper chord 114. In this joint, the web structure has no central region free of connectors such as shown in figure 1, the connector members defining a continuous inclined branch arrangement between the two end panels 136 and 138. As illustrated in figure 6, each connector member 116a, 116b is formed of two obliquely extending planks 124, 126 and 128, 130 having different width. These planks are joined to one another along their contiguous sides 132, 134 as well as to the upper/lower chords in manner similar to that described above with respect to the connector member 16 illustrated in figure 2.

The inclination given to the connector member 16 of figures 1-4 and 116 of figures 5 and 6 depends on the height of the joist. For example, for the joist shown in figures 1-4, having a height  $H_1$  of about 9.25 inches, for example, the angle  $\alpha$  between the planks and the chord is about  $35^\circ$ . On the other hand, for the joist of figures 5 and 6 having a height  $H_2$  of about 11.25 inches, for example, the angle  $\alpha$  is about  $42^\circ$ .

The wood used for all planks of the panel is a kiln dry wood, preferably one selected from the group consisting of fir, spruce and pine. The wood fibers extend in the longitudinal direction of the planks.

Also, the structural glue used in securing the planks together as well as used in the scarfing, is one preferably having a base of resin resorcinol such as phenol-resorcinol resin, or one having a base of urethane, or any one approved for structural wood construction.

Although the invention has been described above in respect to specific forms, it will be evident to a person skilled in the art that it may be modified and refined in various ways. For example, although a pair of planks has been illustrated for each branch, the latter could also be formed of more than two planks. Additionally, a single plank could be formed of two superposed planks joined by finger joints and glue. It is therefore wished to have it understood that the present invention should not be limited in scope except by the terms of the following claims.